

A Safety Data Sheet is not legally required for this product under the Workplace Hazardous Materials Information System (WHMIS). The following information is provided as a courtesy service to our customers.

SECTION 1: IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING**1.1 Product identifier**

Trade name: **SCALEGUARD® II**
Registration number: None
Synonym(s): Release-Controlled, Infused Ceramic Proppant; Semi-Crystalline Alumina Silicate; Sintered Kaolinite
Preparation/Revision date: 9 December 2016

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Proppant for oil and natural gas well hydraulic fracturing and scale inhibition
Uses advised against: None known

1.3 Details of the supplier of the safety data sheet**Manufacturer / Supplier**

Company name: CARBO Ceramics Inc.
Address: 575 N. Dairy Ashford Road, Suite 300
Houston, Texas 77079, USA
Customer service: +1-337-367-6151

1.4 Emergency telephone number

For Chemical Emergency
Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada: 1-800-424-9300

SECTION 2: HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture**

This product is an article that contains a chemical additive intended for time-release after delivery of the proppant into the well. Human and environmental exposure to the chemical additive is not anticipated under normal handling and storage conditions. The following information is provided as a courtesy in case of incidental exposure. This article has been assessed and/or tested for its physical, health and environmental hazards and the following classifications apply.

Classification according to WHMIS (Canada)

Classification: Not controlled

SECTION 2: HAZARDS IDENTIFICATION (CONT'D)**2.2 Label elements**

Contains:	None
Hazard pictogram:	None
Signal word:	None
Hazard statement:	None
Precautionary statements:	
- Prevention:	None
- Response:	None
- Storage:	None
- Disposal:	None
Supplemental label information:	None

2.3 Other hazards None

Hazard summary

Physical hazards:	Not classified for physical hazards.
Health hazards:	While the use of this product as intended generally does not create respirable dusts, small amounts may form from transport or conveyance. Prolonged inhalation of insoluble, respirable (less than 10 micron) dusts can lead to pulmonary damage. Use standard hygienic practices to minimize exposure to dusts that may form. While use of this product as intended does not result in exposure to chemical additives, the chemical additive is harmful if swallowed and exposure may cause irritation of the skin, eyes, nose, throat and mucous membranes.
Environmental hazards:	Not classified for hazards to the environment.
Main symptoms:	Exposure to dust may cause irritation of eyes, nose, throat and mucous membranes. Prolonged contact with skin may cause irritation. The chemical additive is harmful if swallowed. Exposure to the chemical additive may cause irritation of the skin, eyes, nose, throat and mucous membranes. Use of the product as intended does not result in exposure to dust or chemical additives.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

ARTICLE

3.1 Mixture

Chemical Name	Percent	CAS No.	Notes
Substrate			
Ceramic materials and wares, chemicals	85-90	66402-68-4	-
Semi-permeable coating	0-5	Trade Secret	-
Chemical Additive			
Diethylenetriaminepenta(methylenephosphonic acid), sodium salt (DTPMP)	3-10	22042-96-2	-
Sodium hydroxide	< 0.5	1310-73-2	#
Calcium chloride	< 0.2	10043-52-4	#

#: This substance has workplace exposure limit(s)

Composition comments: All concentrations are in percent by weight unless ingredients are a gas. Gas concentrations are in percent by volume.

SECTION 4: FIRST AID MEASURES

General Information

Show this Safety Data Sheet to the medical professional in attendance. Exposure is not anticipated with use of this product as intended. If symptoms occur, follow first aid measures as appropriate.

4.1 Description of first aid measures

Inhalation:	Remove to fresh air. Get medical attention if irritation or symptoms persist.
Skin contact:	Wash with soap and water. Get medical attention if irritation develops or persists.
Eye contact:	Rinse immediately with plenty of water, including under the eyelids, for at least 15 minutes. Get medical attention if irritation or symptoms persist.
Ingestion:	Rinse mouth. Do not induce vomiting. Get medical attention.
Notes to Physician:	None specified

4.2 Most important symptoms and effects, both acute and delayed

Exposure to dust may cause irritation of eyes, nose, throat and mucous membranes. Prolonged contact with skin may cause irritation. The chemical additive is harmful if swallowed. Exposure to the chemical additive may cause irritation of the skin, eyes, nose, throat and mucous membranes. Use of the product as intended does not result in exposure to dust or chemical additives.

SECTION 4: FIRST AID MEASURES (CONT'D)

4.3 Indication of any immediate medical attention and special treatment needed Provide general supportive measures and treat symptoms as needed.

SECTION 5: FIRE FIGHTING MEASURES

General fire hazards Product may ignite if exposed to open flame or other ignition sources.

5.1 Extinguishing Media

Suitable extinguishing media: CO₂, dry chemical, foam or water

Unsuitable extinguishing media: Not applicable

5.2 Special hazards arising from the substance or mixture Not applicable

5.3 Advice for firefighters

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus

Special firefighting procedures: Not applicable

Special remarks on fire hazards: None

SECTION 6: ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

For non-emergency personnel: Avoid dust formation. Avoid exposure to chemical additives. Wear suitable protective clothing. Avoid contact with skin and eyes.

For emergency responders: Use personal protection recommended in Section 8 of the SDS.

6.2 Environmental Precautions None known

6.3 Methods and materials for containing and cleaning up Sweep up spilled substance and remove to safe place. Pick up and arrange for disposal without creating dust. Spilled material can reduce traction and may present a slip hazard. Collect and dispose of spillage as indicated in Section 13.

6.4 Reference to other Sections For personal protection, see Section 8.
For waste disposal, see Section 13.

SECTION 7: HANDLING AND STORAGE

- 7.1 Precautions for safe handling** Avoid dust formation. Avoid breathing dust. Avoid exposure to chemical additives. Observe good industrial hygiene practices. Spilled material can reduce traction and may present a slip hazard.
- 7.2 Conditions for safe storage, including any incompatibilities** Keep container tightly closed. Store in accordance with local, regional, national and international regulations.
- 7.3 Specific end use(s)** Industrial use – oil & gas well stimulation.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Canada. Occupational Exposure Limits

Component	CAS No.	Type	Value	Form
Ceramic materials and wares, chemicals	66402-68-4	N/A	N/A	N/A
Semi-permeable coating	Trade Secret	N/A	N/A	N/A
Diethylenetriaminepenta(methylenephosphonic acid), sodium salt (DTPMP)	22042-96-2	N/A	N/A	N/A
Sodium hydroxide	1310-73-2	ACGIH TLV – Ceiling	2 mg/m ³	N/A
		NIOSH REL – Ceiling	2 mg/m ³	N/A
		NIOSH REL – IDLH	10 mg/m ³	N/A
		PELs – TWA	2 mg/m ³	N/A
Calcium chloride	10043-52-4	N/A	N/A	N/A

Consult local authorities for acceptable exposure limits

8.2 Exposure Controls

Appropriate engineering controls: Observe occupational exposure limits and prevent generation of dusts.

Individual Protective Measures

General Information: Personal protective equipment should be chosen according to applicable standards and in consultation with the supplier of the personal protective equipment. Spilled material can reduce traction and may present a slip hazard.

Eye/face protection: Wear safety glasses with side shields or goggles. Avoid wearing contact lenses while handling.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION (CONT'D)

Skin protection:

- Hand protection: Wear protective gloves.
- Other: Minimize skin contact.

Respiratory protection: In case of inadequate ventilation or risk of inhalation of dust, use a suitable air purifying respirator with particle filter or dust mask (Type P2).

Thermal hazards: Not applicable

Hygiene measures Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Environmental exposure controls Environmental manager must be informed of all major releases.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form	Solid spheres	Explosive properties	Not applicable
Color	Pale green to pale yellow	Explosive limit	Not applicable
Odor	Odorless	Vapor pressure	Not applicable
Odor threshold	Not applicable	Vapor density	Not applicable
pH	Not applicable	Evaporation rate	Not applicable
Melting/freezing point	Not applicable (Cross-linked resin coating) 4,000°F / 2,204°C (Estimated - Substrate)	Relative density	2.5-2.8 (water = 1)
Boiling point, initial boiling point and boiling range	Not applicable	Partition coefficient (n-octanol/water)	No data available
Flash point	Not applicable	Solubility (water)	Insoluble in water
Auto-ignition temperature	Not applicable	Decomposition temperature	No data available
Flammability (solid, gas)	Not applicable	Bulk density	90-105 lb/ft ³ (1,442-1,682 kg/m ³)
Flammability limit-lower%	Not applicable	Viscosity	Not applicable
Flammability limit-upper%	Not applicable	VOC (weight %)	0 %
Oxidizing properties	Not applicable	Percent volatile	Not applicable

9.2 Other Information

No relevant additional information available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
10.2 Chemical stability	Material is stable under normal conditions.
10.3 Possibility of hazardous reactions	Hazardous polymerization does not occur under normal conditions.
10.4 Conditions to avoid	Not specified
10.5 Incompatible materials	Strong oxidizers
10.6 Hazardous decompositions products	Thermal decomposition may produce oxides of carbon, oxides of nitrogen, ammonia, aldehydes or other materials.

SECTION 11: TOXICOLOGICAL INFORMATION**General information on likely routes of exposure**

Ingestion:	May cause discomfort if swallowed. The chemical additive is harmful if swallowed.
Inhalation:	Inhalation of dust or chemical additives may cause respiratory irritation. Use of this product as intended does not result in exposure to dust or chemical additives.
Skin contact:	Dust and chemical additives may irritate skin. Use of this product as intended does not result in exposure to dust or chemical additives.
Eye contact:	Dust and chemical additives may irritate eyes. Use of this product as intended does not result in exposure to dust or chemical additives.
Symptoms:	Exposure to dust may cause irritation of eyes, nose, throat and mucous membranes. Prolonged contact with skin may cause irritation. The chemical additive is harmful if swallowed. Exposure to the chemical additive may cause irritation of the skin, eyes, nose, throat and mucous membranes. Use of the product as intended does not result in exposure to dust or chemical additives.

SECTION 11: TOXICOLOGICAL INFORMATION (CONT'D)

11.1 Information on toxicological effects

Acute Toxicity: No data were identified for the product as a whole. Data are for constituents:

Product / ingredient name	Result	Species	Dose	Exposure
DTPMP	LD ₅₀	Rat	>5,000 mg/kg bw	Oral
	LD ₅₀	Rabbit	>5,000 mg/kg bw	Dermal
Sodium hydroxide	LD ₅₀	Rabbit	325 mg/kg bw	Oral
Calcium chloride	LD ₅₀	Rat	3,798 mg/kg (m), 4,179	Oral
	LD ₅₀	Rabbit	mg/kg (f) 5,000 mg/kg	Dermal

Serious Eye Damage/Irritation: No data were identified for this product as a whole. DTPMP, present in this product at 3-10%, was found to be corrosive to mildly irritating to the eyes of rabbits at high concentrations. Sodium hydroxide, present in this product at less than 0.5%, was non-irritating to the eyes of rabbits at concentrations of 0.2 to 1% and corrosive at concentrations as low as 1.2%. Calcium chloride, present in this product at less than 0.2%, is severely irritating to the eyes of rabbits.

Skin corrosion/Irritation: No data were identified for this product as a whole. DTPMP, present in this product at 3-10%, was found to be slightly irritating to the skin of rabbits when exposed at high concentrations. Sodium hydroxide, present in this product at less than 0.5%, was found to be irritating to the skin of humans at concentrations of 0.5-4.0% and was found to be corrosive to the skin of animals at concentrations exceeding 8%. Calcium chloride, present in this product at less than 0.2%, is non-irritating to slightly irritating to the skin.

Respiratory/Skin Sensitization: No data were identified for this product as a whole. None of the components of this product are known or anticipated to be sensitizers.

Germ Cell Mutagenicity: No data were identified for this product as a whole. None of the components of this product are known or anticipated to be mutagenic. DTPMP, present in this product at 3-10%, is not considered to pose a genotoxic hazard. While evidence for mutagenic potential *in vitro* in mammalian cells is conflicting, DTPMP was negative *in vitro* in bacteria and in an HPRT locus test and *in vivo* in a chromosome aberration study. Sodium hydroxide, present in this product at less than 0.5%, indicated no evidence of mutagenic activity in both *in vitro* and *in vivo* genetic toxicity tests. Genetic toxicity of calcium chloride, present in this product at less than 0.2%, was negative in the bacterial mutation tests and the mammalian chromosome aberration test.

Carcinogenicity: No data were identified for this product as a whole. No evidence of carcinogenicity was observed in chronic toxicity studies in DTPMP.

SECTION 11: TOXICOLOGICAL INFORMATION (CONT'D)

Reproductive Toxicity:	No data were identified for this product as a whole. In a one-generation reproductive toxicity study on DTPMP (present in this product at 3-10%) administered via the diet in rats, no treatment-related histopathological changes were found in the female rats at doses of up to 842 mg/kg body weight and day and none in the males up to 903 mg/kg body weight and day. Sodium hydroxide and calcium chloride, present in this product at less than 0.5% and less than 0.2% respectively, are not expected to be reproductive toxicants.
Developmental Effects:	No data were identified for this product as a whole. In a prenatal developmental toxicity screening study on DTPMP (sodium salt) in rats, the NOAEL for developmental toxicity was 2000 mg/kg bw/day.
STOT – Single Exposure:	No data were identified for this product.
STOT – Repeated Exposure:	No data were identified for this product as a whole. While the use of this product as intended generally does not create respirable dusts, small amounts may form from transport or conveyance. Prolonged inhalation of insoluble, respirable (less than 10 micron) dusts can lead to pulmonary damage. Use standard hygienic practices to minimize exposure to dusts that may form. Calcium chloride, present in this product at less than 0.2%, is not anticipated to be toxic. Calcium and chloride are both essential nutrients for humans and a daily intake of more than 1000 mg each of the ions is recommended.
Aspiration Hazard:	Not relevant based on physical form of the product.
Conclusion/Summary	This product is not expected to produce toxic effects.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity / Aquatic Ecotoxicity No data were identified for this product as a whole. Data are for constituents

Product / ingredient name	Result	Species	Dose	Exposure
DTPMP	EC ₅₀	<i>Chironomus tentans</i>	9,910 mg/L	48 h
	LC ₅₀	<i>Oncorhynchus mykiss</i>	180 - 252 mg/L	96 h
	NOEC	<i>Oncorhynchus mykiss</i>	25.6 mg/L	60 day
	EC ₀	<i>Photobacterium phosphoreum</i> (Bacteria)	>2500 mg/L	30 min
	ErC ₅₀	Algae (species not specified)	>10 mg/L	95 h
	EC ₅₀	<i>Selenastrum capricornutum</i> (Algae)	8.68 mg/L (biomass)	14 d
Sodium Hydroxide*	L(E)C ₅₀	Various aquatic organisms	33 - 189 mg/L	No data
Calcium Chloride	LC ₅₀	<i>Pimephales promelas</i>	4,630 mg/L	96 h
	EC ₅₀	<i>Daphnia magna</i>	1,062 mg/L	48 h
	EC ₅₀	<i>Selenastrum capricornutum</i>	2,900 mg/L	72 h

* The hazard of NaOH for the environment is caused by the hydroxyl ion (pH effect). For this reason the effect of NaOH on the organisms depends on the buffer capacity of the aquatic or terrestrial ecosystem. Also the variation in acute toxicity for aquatic organisms can be explained for a significant extent by the variation in buffer capacity of the test medium.

SECTION 12: ECOLOGICAL INFORMATION (CONT'D)**12.2 Persistence and degradability**

Product is not biodegradable with low solubility in water and is not expected to decompose in the environment. DTPMP, present in this product at 3-10%, is considered not readily biodegradable under standard conditions; however, there was some evidence of degradation by abiotic processes in natural waters and following acclimation or under conditions of low inorganic phosphate. Sodium hydroxide will rapidly dissolve and dissociate in water.

12.3 Bioaccumulative potential

Product is not biodegradable with low solubility in water and is not expected to accumulate in the environment. DTPMP, present in this product at 3-10%, is not expected to be bioaccumulative, based on its low Log Kow and read-across to related substances. Sodium hydroxide, present in this product at less than 0.5%, is not expected to bioconcentrate in organisms due to its high water solubility and rapid dissociation in water.

12.4 Mobility

No data available

12.5 Results of PBT and vPvB assessment

Not a PBT or vPvB material

12.6 Other adverse effects

This product is not classified as hazardous to the environment.

Conclusion/Summary

Ecotoxicity data from comparable products indicates that this product is non-toxic in the environment.

SECTION 13: DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods**

Residual waste:

Dispose of in accordance with all applicable regulations.

Contaminated packaging:

Empty containers should be taken to an approved waste handling site for recycling or disposal.

Disposal methods/information:

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local, regional, national, international regulations.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14: TRANSPORT INFORMATION

14.1 UN Number	Not applicable, not regulated as hazardous for transport.
14.2 UN proper shipping name	Not applicable, not regulated as hazardous for transport.
14.3 Transport hazard class(es)	Not applicable, not regulated as hazardous for transport.
14.4 Packing group	Not applicable, not regulated as hazardous for transport.
14.5 Environmental hazards	Not applicable, not regulated as hazardous for transport.
14.6 Special precautions for user	Not applicable, not regulated as hazardous for transport.
14.7 Transport in bulk according to Annex II MARPOL73/78 and the IBC Code	Not applicable, not regulated as hazardous for transport.

The transport regulation may vary based on the country of use. Check for the appropriate regulations in the country of transport or usage of this product.

SECTION 15: REGULATORY INFORMATION**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****Canadian Regulations**

WHMIS (Canada):	This product has been classified according to the hazard criteria of the CPR and the SDS contains all of the information required by the CPR.
WHMIS Ingredient Disclosure List (Canada):	Not listed
CEPA (DSL):	All components are listed or exempted.
CEPA (NPRI):	Not listed

Other Regulations None specified

SECTION 16: OTHER INFORMATION**Label Requirements**

None

List of abbreviations

CAS	Chemical Abstract Service
EC50/90	Effective Concentration (median / 90 th percentile)
LC50/90	Lethal Concentration (median / 90 th percentile)
PBT	Persistent, Bioaccumulative and Toxic
vPvB	Very Persistent and Very Bioaccumulative
WHMIS	Workplace Hazardous Materials Information System (Canada)

References

ChemAdvisor List of Lists (LOLI)
IARC Monographs. Overall Evaluation of Carcinogenicity
IUCLID DATA Set
Supplier Safety Data Sheet

Information on evaluation method leading to the classification of mixture

The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available. For details refer to Sections 9, 11 and 12.

Full test of any statements or R-phrases and H-phrases under Section 2 to 12

None

Training information

Follow training instructions when handling this material.

SDS Revisions

SDS prepared on 9 December 2016.

Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.